WHAT IS CLAIMED IS:

1. A photoelectric conversion apparatus having a photoelectric conversion circuit section comprising a plurality of photoelectric conversion elements, switching elements, matrix signal wires, and gate drive wires arranged on a same substrate in order to output parallel signals, a driving circuit section for applying a driving signal to said gate drive wire, and a reading circuit section for converting the parallel signals transferred through said matrix signal wires to serial signals to output the serial signals,

wherein said reading circuit section comprises at least one analog operational amplifier connected with each of said matrix signal wires, transfer switches for transferring output signals from said respective matrix signal wires, output through each said analog operational amplifier, reading capacitors for accumulating said output signals transferred, and reading switches for successively reading signals out of said reading capacitors in the form of serial signals.

2. The photoelectric conversion apparatus according to Claim 1, wherein in said reading circuit section, said analog operational amplifier of first stage connected to each of said matrix signal wires has a noise voltage density Vn ($V/\sqrt{Hz}$) converted at an

input terminal portion thereof and a frequency band B (Hz) enough to amplify a signal from said photoelectric conversion circuit section and satisfies the relation of:

$$Vn \times \sqrt{B} \leq Tn$$

against thermal noise effective voltage Tn (Vrms) of said switching element at the input terminal portion of said analog operational amplifier, occurring when the switching element in said photoelectric conversion circuit section is turned on.

3. The photoelectric conversion apparatus according to Claim 1, wherein in said reading circuit section, a capacitor element for letting only alternating-current components pass is connected to midway of an output wire from an output terminal of said analog operational amplifier connected with each of said matrix signal wires and wherein a reset switch for DC restoration of said capacitor element is provided.

4. The photoelectric conversion apparatus according to Claim 1, wherein in said reading circuit section, at least one said analog operational amplifier connected with each of said matrix signal wires is provided with a function to change an amplification factor thereof by a signal from the outside.

5. The photoelectric conversion apparatus according to Claim 1, wherein in said reading circuit section, said analog operational amplifier connected with each of said matrix signal wires is provided with a function to reduce a consumption electric current thereof by a signal from the outside.

6. The photoelectric conversion apparatus according to Claim 1, wherein an A/D conversion circuit section for converting an analog signal to a digital signal is connected to said reading circuit section, said A/D conversion circuit section comprises N (N is an integer of not less than 2) operational amplifiers for amplifying a signal from said reading circuit section and N A/D converters of M bits, a ratio of amplification factors G1, G2,..., GN of said N operational amplifiers is set to $G1:G2:\ldots:GN = 2^0:2^1:\ldots:2^{N-1}$, outputs from said N operational amplifiers each are input to said N A/D converters, and an output of one A/D converter is selected out of said N A/D converters in accordance with an output level of an analog signal from said reading circuit section and is output as a digital value of (N + M - 1) bits.

7. The photoelectric conversion apparatus according to Claim 1, wherein the photoelectric conversion elements and switching elements in said

photoelectric conversion circuit section comprise an amorphous silicon semiconductor as a semiconductor layer.

8. The photoelectric conversion apparatus according to Claim 1, wherein in said reading circuit section another second analog operational amplifier is provided near said analog operational amplifier of first stage connected to each of the matrix signal wires, said analog operational amplifier of first stage is a non-inverting amplifier having an amplification factor of not less than 1×, and said second analog operational amplifier is a buffer amplifier having an amplification factor of 1×.

9. The photoelectric conversion apparatus according to Claim 8, wherein said analog operational amplifier receives supply of a reference potential from said second analog operational amplifier.

10. The photoelectric conversion apparatus according to Claim 3, comprising a resistance element between said capacitor element and said reset switch.

11. The photoelectric conversion apparatus according to Claim 10, comprising means for controlling an on/off time of said reset switch.

12. The photoelectric conversion apparatus according to Claim 11, wherein said means for controlling the on/off time of said reset switch comprises a signal input section for changing the on/off time of said reset switch.

13. The photoelectric conversion apparatus according to Claim 3, wherein a low-pass filter circuit is connected to a connecting part different from a connecting part of said capacitor element connected to the output of said analog operational amplifier.

14. The photoelectric conversion apparatus according to Claim 1, wherein said analog operational amplifier is arranged to be capable of changing a slew rate.

15. The photoelectric conversion apparatus according to Claim 14, wherein said analog operational amplifier comprises a signal input section for changing the slew rate.

16. The photoelectric conversion apparatus according to Claim 1, wherein said photoelectric conversion elements comprise a first electroconductive layer, an insulating layer, a semiconductor layer having a photoelectric conversion function, an

injection preventing layer, and a second electroconductive layer in this order.

17. The photoelectric conversion apparatus according to Claim 16, wherein said injection preventing layer comprises an n-type semiconductor layer.

18. The photoelectric conversion apparatus according to Claim 16, wherein said semiconductor layer contains an amorphous silicon semiconductor material.

19. The photoelectric conversion apparatus according to Claim 16, wherein said insulating layer contains an amorphous silicon nitride material.

20. The photoelectric conversion apparatus according to Claim 16, wherein said first or second electroconductive layer contains a transparent electroconductive layer.

21. The photoelectric conversion apparatus according to Claim 16, wherein said insulating layer prevents passage of electrons and holes.

22. The photoelectric conversion apparatus according to Claim 16, wherein said preventing layer

prevents passage of holes but permits passage of electrons.

23. The photoelectric conversion apparatus according to Claim 16, wherein said switching elements comprise thin-film transistors.

24. The photoelectric conversion apparatus according to Claim 1, wherein said switching elements comprise a gate electrode formed of a first electroconductive layer, a gate insulating layer of an insulating layer, a semiconductor layer, ohmic contact layers spaced on said semiconductor layer, and second electroconductive layers provided each on said ohmic contact layers.

25. The photoelectric conversion apparatus according to Claim 16, wherein said first electroconductive layer, insulating layer, semiconductor layer, and injection preventing layer of said photoelectric conversion elements are formed of common layers to gate electrode, gate insulating layer, semiconductor layer, and ohmic contact layer of the switching elements, respectively.

26. The photoelectric conversion apparatus according to Claim 1, wherein said plurality of

photoelectric conversion elements are divided in a plurality of groups each including a desired number of photoelectric conversion elements.

27. The photoelectric conversion apparatus according to Claim 1, comprising means for generating a refresh signal for turning said photoelectric conversion elements into an initial state.

28. The photoelectric conversion apparatus according to Claim 16, comprising means for generating a refresh signal for turning said photoelectric conversion elements into an initial state.

29. The photoelectric conversion apparatus according to Claim 28, wherein said photoelectric conversion elements are divided in a plurality of groups each including a desired number of photoelectric conversion elements and each group of photoelectric conversion elements are connected to the means for generating the refresh signal in common.

30. The photoelectric conversion apparatus according to Claim 1, further comprising a wavelength converting member on the light incident side of said photoelectric conversion apparatus.

31. The photoelectric conversion apparatus according to Claim 30, wherein said wavelength converting member contains a fluorescent member.

32. A photoelectric conversion system having at least: a photoelectric conversion apparatus having a photoelectric conversion circuit section comprising a plurality of photoelectric conversion elements, switching elements, matrix signal wires, and gate drive wires arranged on a same substrate in order to output parallel signals, a driving circuit section for applying a driving signal to said gate drive wire, and a reading circuit section for converting the parallel signals transferred through said matrix signal wires to serial signals to output the serial signals; and a light source;

wherein said reading circuit section of said photoelectric conversion apparatus comprises at least one analog operational amplifier connected with each of said matrix signal wires, transfer switches for transferring output signals from said respective matrix signal wires, output through each said analog operational amplifier, reading capacitors for accumulating said output signals transferred, and reading switches for successively reading signals out of said reading capacitors in the form of serial signals.

33. The photoelectric conversion system according to Claim 32, wherein in said reading circuit section, said analog operational amplifier of first stage connected to each of said matrix signal wires has a noise voltage density Vn ($V/\sqrt{Hz}$) converted at an input terminal portion thereof and a frequency band B (Hz) enough to amplify a signal from said photoelectric conversion circuit section and satisfies the relation of:

$$Vn \times \sqrt{B} \leq Tn$$

against thermal noise effective voltage Tn (Vrms) of said switching element at the input terminal portion of said analog operational amplifier, occurring when the switching element in said photoelectric conversion circuit section is turned on.

34. The photoelectric conversion system according to Claim 32, wherein in said reading circuit section, a capacitor element for letting only alternating-current components pass is connected to midway of an output wire from an output terminal of said analog operational amplifier connected with each of said matrix signal wires and wherein a reset switch for DC restoration of said capacitor element is provided.

35. The photoelectric conversion system according to Claim 32, wherein in said reading circuit section,

at least one said analog operational amplifier connected with each of said matrix signal wires is provided with a function to change an amplification factor thereof by a signal from the outside.

36. The photoelectric conversion system according to Claim 32, wherein in said reading circuit section, said analog operational amplifier connected with each of said matrix signal wires is provided with a function to reduce a consumption electric current thereof by a signal from the outside.

37. The photoelectric conversion system according to Claim 32, wherein an A/D conversion circuit section for converting an analog signal to a digital signal is connected to said reading circuit section, said A/D conversion circuit section comprises N (N is an integer of not less than 2) operational amplifiers for amplifying a signal from said reading circuit section and N A/D converters of M bits, a ratio of amplification factors G1, G2,..., GN of said N operational amplifiers is set to G1:G2:...:GN = $2^0:2^1:...:2^{N-1}$, outputs from said N operational amplifiers each are input to said N A/D converters, and an output of one A/D converter is selected out of said N A/D converters in accordance with an output level of an analog signal from said reading circuit section and

is output as a digital value of (N + M - 1) bits.

38. The photoelectric conversion system according to Claim 32, wherein the photoelectric conversion elements and switching elements in said photoelectric conversion circuit section comprise an amorphous silicon semiconductor as a semiconductor layer.

39. The photoelectric conversion system according to Claim 32, wherein in said reading circuit section another second analog operational amplifier is provided near said analog operational amplifier of first stage connected to each of the matrix signal wires, said analog operational amplifier of first stage is a non-inverting amplifier having an amplification factor of not less than 1×, and said second analog operational amplifier is a buffer amplifier having an amplification factor of 1×.

40. The photoelectric conversion system according to Claim 39, wherein said analog operational amplifier receives supply of a reference potential from said second analog operational amplifier.

41. The photoelectric conversion system according to Claim 34, comprising a resistance element between said capacitor element and said reset switch.

42. The photoelectric conversion system according to Claim 41, comprising means for controlling an on/off time of said reset switch.

43. The photoelectric conversion system according to Claim 42, wherein said means for controlling the on/off time of said reset switch comprises a signal input section for changing the on/off time of said reset switch.

44. The photoelectric conversion system according to Claim 34, wherein a low-pass filter circuit is connected to a connecting part different from a connecting part of said capacitor element connected to the output of said analog operational amplifier.

45. The photoelectric conversion system according to Claim 32, wherein said analog operational amplifier is arranged to be capable of changing a slew rate.

46. The photoelectric conversion system according to Claim 45, wherein said analog operational amplifier comprises a signal input section for changing the slew rate.

47. The photoelectric conversion system according to Claim 32, wherein said photoelectric conversion

elements comprise a first electroconductive layer, an insulating layer, a semiconductor layer having a photoelectric conversion function, an injection preventing layer, and a second electroconductive layer in this order.

48. The photoelectric conversion system according to Claim 47, wherein said injection preventing layer comprises an n-type semiconductor layer.

49. The photoelectric conversion system according to Claim 47, wherein said semiconductor layer contains an amorphous silicon semiconductor material.

50. The photoelectric conversion system according to Claim 47, wherein said insulating layer contains an amorphous silicon nitride material.

51. The photoelectric conversion system according to Claim 47, wherein said first or second electroconductive layer contains a transparent electroconductive layer.

52. The photoelectric conversion system according to Claim 47, wherein said insulating layer prevents passage of electrons and holes.

53. The photoelectric conversion system according to Claim 47, wherein said preventing layer prevents passage of holes but permits passage of electrons.

54. The photoelectric conversion system according to Claim 47, wherein said switching elements comprise thin-film transistors.

55. The photoelectric conversion system according to Claim 32, wherein said switching elements comprise a gate electrode formed of a first electroconductive layer, a gate insulating layer of an insulating layer, a semiconductor layer, ohmic contact layers spaced on said semiconductor layer, and second electroconductive layers provided each on said ohmic contact layers.

56. The photoelectric conversion system according to Claim 47, wherein said first electroconductive layer, insulating layer, semiconductor layer, and injection preventing layer of said photoelectric conversion elements are formed of common layers to gate electrode, gate insulating layer, semiconductor layer, and ohmic contact layer of the switching elements, respectively.

57. The photoelectric conversion system according to Claim 32, wherein said plurality of photoelectric

conversion elements are divided in a plurality of groups each including a desired number of photoelectric conversion elements.

58. The photoelectric conversion system according to Claim 32, comprising means for generating a refresh signal for turning said photoelectric conversion elements into an initial state.

59. The photoelectric conversion system according to Claim 47, comprising means for generating a refresh signal for turning said photoelectric conversion elements into an initial state.

60. The photoelectric conversion system according to Claim 59, wherein said photoelectric conversion elements are divided in a plurality of groups each including a desired number of photoelectric conversion elements and each group of photoelectric conversion elements are connected to the means for generating the refresh signal in common.

61. The photoelectric conversion system according to Claim 32, further comprising a wavelength converting member on the light incident side of said photoelectric conversion apparatus.

62. The photoelectric conversion system according to Claim 32, comprising a grid between said photoelectric conversion apparatus and said light source.

63. The photoelectric conversion system according to Claim 62, comprising a wavelength converting member between said photoelectric conversion apparatus and said grid.

64. The photoelectric conversion system according to Claim 61, wherein said wavelength converting member contains a fluorescent member.

65. The photoelectric conversion system according to Claim 63, wherein said wavelength converting member contains a fluorescent member.